**3GPP TSG RAN meeting #98-e RP-223057**

**Electronic Meeting, December 12-16, 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network |  |

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| --- |
|  |
| ***Title:***  | CR on R17 TS 38.104 to add channel raster exception for band n28 |
|  |  |
| ***Source to WG:*** |  |
| ***Source to TSG:*** | RAN4  |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** | A |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | Band n28 RRC reconfiguration failure issue is found during field test when 30MHz UE accessing 40MHz network. The reason is that 30MHz minimum guard band is larger than that of 40MHz CBW. This issue is first proposed in RAN4 #103-e meeting (R4-2208401) hoping to find out unified solution to resolve such issue. After 4-meeting discussion, solution 3 is finally approved in WF (R4-2220816) which require to allow 40kHz channel raster exception for n28 at gNB side. This CR on 38.104 is used to capture such agreements in WF R4-2220816 which has been approved in RAN4 #105 meeting.  |
|  |  |
| ***Summary of change:*** | Add 40kHz channel raster exception for band n28 at gNB side. |
|  |  |
| ***Consequences if not approved:*** | Practical channel raster in commercial network for n28 doesn’t follow the spec requirements. |
|  |  |
| ***Clauses affected:*** | 5.4.2.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

5.4.2.3 Channel raster entries for each *operating band*

The RF channel positions on the channel raster in each NR *operating band* are given through the applicable NR-ARFCN in table 5.4.2.3-1 for FR1 and table 5.4.2.3-2 for FR2, using the channel raster to resource element mapping in clause 5.4.2.2.

- For NR *operating bands* with 100 kHz channel raster, ΔFRaster = 20 × ΔFGlobal. In this case, every 20th NR-ARFCN within the *operating band* are applicable for the channel raster within the *operating band* and the step size for the channel raster in table 5.4.2.3-1 is given as <20>.

- For NR *operating bands* with 15 kHz channel raster below 3 GHz, ΔFRaster = *I* × ΔFGlobal, where *I* ϵ {3,6}. In this case, every *Ith* NR‑ARFCN within the *operating band* are applicable for the channel raster within the *operating band* and the step size for the channel raster in table 5.4.2.3-1 is given as <*I*>.

- For NR *operating bands* with 15 kHz and 60 kHz channel raster above 3 GHz, ΔFRaster = *I* ×ΔFGlobal, where *I* ϵ {1, 2}. In this case, every *Ith* NR‑ARFCN within the *operating band* are applicable for the channel raster within the *operating band* and the step size for the channel raster in table 5.4.2.3-1 and table 5.4.2.3-2 is given as <*I*>.

- For frequency bands with two ΔFRaster in FR1, the higher ΔFRaster applies to channels using only the SCS that is equal to or larger than the higher ΔFRaster and SSB SCS is equal to the higher ΔFRaster.

- For frequency bands with two ΔFRaster in FR2, the higher ΔFRaster applies to channels using only the SCS that is equal to the higher ΔFRaster and the SSB SCS that is equal to or larger than the higher ΔFRaster.

**Table 5.4.2.3-1: Applicable NR-ARFCN per *operating band* in FR1**

|  |  |  |  |
| --- | --- | --- | --- |
| **NR *operating band*** | **ΔFRaster****(kHz)**  | **Uplink****range of NREF****(First – <Step size> – Last)** | **Downlink****range of NREF****(First – <Step size> – Last)** |
| n1 | 100 | 384000 – <20> – 396000 | 422000 – <20> – 434000 |
| n2 | 100 | 370000 – <20> – 382000 | 386000 – <20> – 398000 |
| n3 | 100 | 342000 – <20> – 357000 | 361000 – <20> – 376000 |
| n5 | 100 | 164800 – <20> – 169800 | 173800 – <20> – 178800 |
| n7 | 100 | 500000 – <20> – 514000 | 524000 – <20> – 538000 |
| n8 | 100 | 176000 – <20> – 183000 | 185000 – <20> – 192000 |
| n12 | 100 | 139800 – <20> – 143200 | 145800 – <20> – 149200 |
| n13 | 100 | 155400 – <20> – 157400 | 149200 – <20> – 151200 |
| n14 | 100 | 157600 – <20> –159600 | 151600 – <20> – 153600 |
| n18 | 100 | 163000 – <20> – 166000 | 172000 – <20> – 175000 |
| n20 | 100 | 166400 – <20> – 172400 | 158200 – <20> – 164200 |
| n25 | 100 | 370000 – <20> – 383000 | 386000 – <20> – 399000 |
| n24 | 100 | 325300 – <20> – 332100 | 305000 – <20> – 311800 |
| n26 | 100 | 162800 – <20> – 169800 | 171800 – <20> – 178800 |
| n28 | 100 | 140600 – <20> – 149600 | 151600 – <20> – 160600 |
|  | 1446084 | 1556084 |
| n29 | 100 | N/A | 143400 – <20> – 145600 |
| n30 | 100 | 461000 – <20> – 463000 | 470000 – <20> – 472000 |
| n34 | 100 | 402000 – <20> – 405000 | 402000 – <20> – 405000 |
| n38 | 100 | 514000 – <20> – 524000 | 514000 – <20> – 524000 |
| n39 | 100 | 376000 – <20> – 384000 | 376000 – <20> – 384000 |
| n40 | 100 | 460000 – <20> – 480000 | 460000 – <20> – 480000 |
| n41 | 15 | 499200 – <3> – 537999 | 499200 – <3> – 537999 |
|  | 30 | 499200 – <6> – 537996 | 499200 – <6> – 537996 |
| n461 | 15 | 743334 – <1> – 795000 | 743334 – <1> – 795000 |
| n48 | 15 | 636667 – <1> – 646666 | 636667 – <1> – 646666 |
|  | 30 | 636668 – <2> – 646666 | 636668 – <2> – 646666 |
| n50 | 100 | 286400 – <20> – 303400 | 286400 – <20> – 303400 |
| n51 | 100 | 285400 – <20> – 286400 | 285400 – <20> – 286400 |
| n53 | 100 | 496700 – <20> – 499000 | 496700 – <20> – 499000 |
| n65 | 100 | 384000 – <20> – 402000 | 422000 – <20> – 440000 |
| n66 | 100 | 342000 – <20> – 356000 | 422000 – <20> – 440000 |
| n67 | 100 | N/A | 147600 – <20> – 151600 |
| n70 | 100 | 339000 – <20> – 342000 | 399000 – <20> – 404000 |
| n71 | 100 | 132600 – <20> – 139600 | 123400 – <20> – 130400 |
| n74 | 100 | 285400 – <20> – 294000 | 295000 – <20> – 303600 |
| n75 | 100 | N/A | 286400 – <20> – 303400 |
| n76 | 100 | N/A | 285400 – <20> – 286400 |
| n77 | 15 | 620000 – <1> – 680000 | 620000 – <1> – 680000 |
|  | 30 | 620000 – <2> – 680000 | 620000 – <2> – 680000 |
| n78 | 15 | 620000 – <1> – 653333 | 620000 – <1> – 653333 |
|  | 30 | 620000 – <2> – 653332 | 620000 – <2> – 653332 |
| n79 | 15 | 693334 – <1> – 733333 | 693334 – <1> – 733333 |
|  | 30 | 693334 – <2> – 733332 | 693334 – <2> – 733332 |
| n80 | 100 | 342000 – <20> – 357000 | N/A |
| n81 | 100 | 176000 – <20> – 183000 | N/A |
| n82 | 100 | 166400 – <20> – 172400  | N/A |
| n83 | 100 | 140600 – <20> –149600 | N/A |
| n84 | 100 | 384000 – <20> – 396000 | N/A |
| n85 | 100 | 139600 – <20> – 143200 | 145600 – <20> – 149200 |
| n86 | 100 | 342000 – <20> – 356000 | N/A |
| n89 | 100 | 164800 – <20> – 169800 | N/A |
|  | 15 | 499200 – <3> – 537999 | 499200 – <3> – 537999 |
| n90 | 30 | 499200 – <6> – 537996 | 499200 – <6> – 537996 |
|  | 100 | 499200 – <20> – 538000 | 499200 – <20> – 538000 |
| n91 | 100 | 166400 – <20> – 172400 | 285400 – <20> – 286400 |
| n92 | 100 | 166400 – <20> – 172400 | 286400 – <20> – 303400 |
| n93 | 100 | 176000 – <20> – 183000 | 285400 – <20> – 286400 |
| n94 | 100 | 176000 – <20> – 183000 | 286400 – <20> – 303400 |
| n95 | 100 | 402000 – <20> – 405000 | N/A |
| n962 | 15 | 795000 – <1> – 875000 | 795000 – <1> – 875000 |
| n97 | 100 | 460000 – <20> – 480000 | N/A |
| n98 | 100 | 376000 – <20> – 384000 | N/A |
| n99 | 100 | 325300 -- <20> – 332100 | N/A |
| n100 | 100 | 174880 – <20> – 176000 | 183880 – <20> – 185000 |
| n101 | 100 | 380000 – <20> – 382000 | 380000 – <20> – 382000 |
| n1023 | 15 | 796334 – <1> – 828333 | 796334 – <1> – 828333 |
| n104 | 15 | 828334 – <1> – 875000 | 828334 – <1> – 875000 |
|  | 30 | 828334 – <2> – 875000 | 828334 – <2> – 875000 |
| NOTE 1: Applicable NR-ARFCN for band n46 for 10 MHz channel bandwidth, NREF = {782000, 788668} for 20 MHz channel bandwidth, NREF = {744000, 745332, 746668, 748000, 749332, 750668, 752000, 753332, 754668, 756000, 765332, 766668, 768000, 769332, 770668, 772000, 773332, 774668, 776000, 777332, 778668, 780000, 781332, 783000, 784332, 785668, 787000, 788332, 789668, 791000, 792332, 793668}; for 40 MHz channel bandwidth, NREF = {744668, 746000, 748668, 751332, 754000, 755332, 766000, 767332, 770000, 772668, 775332, 778000, 780668, 783668, 786332, 787668, 790332, 793000}; for 60 MHz channel bandwidth, NREF = {745332, 746668, 748000, 752000, 753332, 754668, 766668, 768000, 769332, 773332, 774668, 778668, 780000, 784332, 785668, 791000, 792332}; for 80 MHz channel bandwidth, NREF = {746000, 747332, 752668, 754000, 767332, 768668, 774000, 779332, 785000, 791668} for 100 MHz channel bandwidth, NREF = {746668, 753332, 768000, 791000}NOTE 2: Applicable NR-ARFCN for band n96 for 20 MHz channel bandwidth, NREF = {797000, 798332, 799668, 801000, 802332, 803668, 805000, 806332, 807668, 809000, 810332, 811668, 813000, 814332, 815668, 817000, 818332, 819668, 821000, 822332, 823668, 825000, 826332, 827668, 829000, 830332, 831668, 833000, 834332, 835668, 837000, 838332, 839668, 841000, 842332, 843668, 845000, 846332, 847668, 849000, 850332, 851668, 853000, 854332, 855668, 857000, 858332, 859668, 861000, 862332, 863668, 865000, 866332, 867668, 869000, 870332, 871668, 873000, 874332} for 40 MHz channel bandwidth, NREF = {797668, 800332, 803000, 805668, 808332, 811000, 813668, 816332, 819000, 821668, 824332, 827000, 829668, 832332, 835000, 837668, 840332, 843000, 845668, 848332, 851000, 853668, 856332, 859000, 861668, 864332, 867000, 869668, 872332} for 60 MHz channel bandwidth, NREF = {798332, 799668, 803668, 805000, 809000, 810332, 814332, 815668, 819668, 821000, 825000, 826332, 830332, 831668, 835668, 837000, 841000, 842332, 846332, 847668, 851668, 853000, 857000, 858332, 862332, 863668, 867668, 869000, 873000} for 80 MHz channel bandwidth, NREF = {799000, 804332, 809668, 815000, 820332, 825668, 831000, 836332, 841668, 847000, 852332, 857668, 863000, 868332} for 100 MHz channel bandwidth, NREF = {799668, 803668, 810332, 814332, 821000, 825000, 831668, 835668, 842332, 846332, 853000, 857000, 863668, 867668, 869000, 870332, 871668}NOTE 3: Applicable NR-ARFCN for band n102 for 20 MHz channel bandwidth, NREF = {795668, 797000, 798332, 799668, 801000, 802332, 803668, 805000, 806332, 807668, 809000, 810332, 811668, 813000, 814332, 815668, 817000, 818332, 819668, 821000, 822332, 823668, 825000, 826332, 827668} for 40 MHz channel bandwidth, NREF = {797668, 800332, 803000, 805668, 808332, 811000, 813668, 816332, 819000, 821668, 824332, 827000} for 60 MHz channel bandwidth, NREF = {798332, 799668, 803668, 805000, 809000, 810332, 814332, 815668, 819668, 821000, 825000, 826332} for 80 MHz channel bandwidth, NREF = {799000, 804332, 809668, 815000, 820332, 825668} for 100 MHz channel bandwidth, NREF = {799668, 803668, 810332, 814332, 821000, 825000}NOTE 4: The exceptional raster point for n28 is only applicable for enabling a 30MHz UE channel bandwidth in a 40MHz BS channel bandwidth. |

**Table 5.4.2.3-2: Applicable NR-ARFCN per *operating band* in FR2**

|  |  |  |
| --- | --- | --- |
| **NR *operating band*** | **ΔFRaster****(kHz)**  | **Uplink and Downlink****range of NREF****(First – <Step size> – Last)** |
| n257 | 60 | 2054166 – <1> – 2104165 |
|  | 120 | 2054167 – <2> – 2104165 |
| n258 | 60 | 2016667 – <1> – 2070832 |
|  | 120 | 2016667 – <2> – 2070831 |
| n259 | 60 | 2270833 – <1> – 2337499 |
|  | 120 | 2270833 – <2> – 2337499 |
| n260 | 60 | 2229166 – <1> – 2279165 |
|  | 120 | 2229167 – <2> – 2279165 |
| n261 | 60 | 2070833 – <1> – 2084999 |
|  | 120 | 2070833 – <2> – 2084999 |
| n262 | 60 | 2399166 – <1> – 2415832 |
|  | 120 | 2399167 – <2> – 2415831 |
| n263 | 120 | See Table 5.4.2.3-2 |
|  | 480 |  |
|  | 960 |  |

**Table 5.4.2.3-3: Applicable NR-ARFCN for operation in band n263**

|  |  |
| --- | --- |
| **Channel Bandwidth** | **Applicable NR-ARFCN** |
| 100 MHz | 2564083 + 1680 \* N, N = 0:137 |
| 400 MHz | 2566603 + 6720 \* N, N = 0:33 |
| 800 MHz | 2569963 + 6720 \* N, N = 0:32 |
| 1600 MHz | 2576683 + 6720 \* N, N =0:30 |
| 2000 MHz | 2580043 + 6720 \* N, N=0:29,2585083, 2655643, 2692603, 2764843 |